3.1 Exponential & Logarithms

Question Paper

Course	Edexcel IAL Maths: Pure 3
Section	3. Logs & Exponentials
Topic	3.1 Exponential & Logarithms
Difficulty	Hard

Time allowed: **50**

Score: **/40**

Percentage: **/100**

Question 1

(a) On the same axes, sketch the graphs of $y = 4^x$ and $y = 5^x$.
Label any points of intersection with the coordinate axes.
Write down the equations of any asymptotes.

[4 marks]

Question 1

(b) Write down an equation for the graph that is a reflection of $y = 4^x$ in the y-axis.

[1 mark]

Question 2

(a) (i) Sketch the graph of $y = 0.4^x$.
(ii) State whether this graph indicates exponential growth or exponential decay.

[3 marks]

Question 2

(b) Find the value of x when $y = 0.064$.

[1 mark]

Question 3

(a) Find the value of $\log 1000 + \log 10\,000$.

[1 mark]

Question 3

(b) Write down the value of a in the statement $6^{\log_6 a} = 36$.

[1 mark]

Question 3

(c) Evaluate $\frac{2\log_4 64 + 3^{\log_2 8} - \log_5 5}{\log 100}$.

[2 marks]

Question 4

(a) Solve $2\log 1000 = x\log_{16} 4$.

[2 marks]

Question 4

(b) Solve $3\log_4 x = \log_4 x + 3\log_5 25$.

[2 marks]

Question 5

Solve $2(2^{2x}) + 4 = 9(2^x)$.

[3 marks]

Question 6

(a) Sketch the graph of $y = 12e^{-x}$ for $x \geq 0$.
Label any points of intersection with the coordinate axes.
Write down the equations of any asymptotes.

[3 marks]

Question 6

(b) Write down the gradient of $y = 12e^{-x}$ at the point where $x = 0$.

[1 mark]

Question 7

The function $f(x)$ is defined by $f(x) = 3e^{2x}$ for $x \in \mathbb{R}$.

(a) Find $f(2x)$.

[2 marks]

Question 7

(b) Find $f'(2x)$.

[2 marks]

Question 8

Solve $2e^{2x} = e^x + 10$, giving your answer to 3 significant figures.

[3 marks]

Question 9

(a) Find the gradient of the curve $y = ae^{bx}$, where a and b are constants.

[1 mark]

Question 9

(b) At the point $(0, a)$ the gradient is 12, find b in terms of a.

[2 marks]

Question 9

(c) Hence write down y in terms of a (and x) only.

[1 mark]

Question 10

(a) Show that the equation $e^x - e^{-x} = 0$ has only one real solution.

[3 marks]

Question 10

(b) Explain why the equation $e^x + e^{-x} = 0$ has no real solutions.

[2 marks]